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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/036,479	01/07/2002	John Alec Sydney Smith	604-624	3561
23117	7590	10/17/2005		
NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			EXAMINER STEVENS, THOMAS H	
			ART UNIT 2123	PAPER NUMBER
DATE MAILED: 10/17/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/036,479

Applicant(s)

SMITH ET AL.

Examiner

Thomas H. Stevens

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 August 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/3/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-26 were examined.

Section I: Final Office Action (2nd Office Action)

New Examiner of Record

2. The examiner of record is Tom Stevens in place of examiner Mary Hogan.

Claim Rejections - 35 USC § 103

3. **Claims 1-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Barrall et al (U.S. Patent Number 6,392,408), herein referred to as Barrall, and further in view of Schaewe et al (Schaewe et al, "Parallel Algorithms for Maximum A Posteriori Estimation of Spin Density and Spin-Spin Decay in Magnetic Resonance Imaging", IEEE Transactions on Medical Imaging, Vol. 14, No. 2, June 1995), herein referred to as **Schaewe**.

4. As to **Claims 1, 9, 12, 15, 19 and 23**, **Barrall** teaches: (producing means for) producing response signal (column 7, lines 3-6, lines 14-21, column 10, lines 45-51); (detecting means for) detecting a signal comprising a resonance response from the sample (column 10, lines 51-60); (comparing means for) comparing the signal to a predetermined model of a signal (response from a sample) due to a phenomenon, thereby to determine whether the signal is due to that phenomenon (whether the sample is present) (column 14, lines 52-67); storage means for storing a predetermined model of a signal due to a phenomenon (column 15, lines 1-10).

5. As to **Claim 2**, **Barrall** teaches: wherein the predetermined model is a predetermined model of a response from a particular sample and the comparing step is

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to determine whether the model represents a response from the particular sample (column 9, lines 21-27, column 14, line 52-59, column 15, lines 1-4).

6. As to **Claim 3, Barrall** teaches: wherein the signal comprises a response from a sample and an undesired signal and the comparing step is to distinguish the response from the undesired signal (column 11, lines 17-43).

7. As to **Claims 6 and 17, Barrall** teaches: wherein the producing step and the comparing step are carried out with models having increasing numbers of components (column 11, lines 28-43).

8. As to **Claims 8, 18 and 20, Barrall** teaches: a method of testing a sample, further comprising applying excitation to the sample and detecting the response to yield the signal (column 10, lines 45-55).

9. As to **Claims 10 and 21, Barrall** teaches: a method according to claim 8 wherein the signal is compared to a predetermined model of an undesired signal, the method further comprising applying further excitation in dependence on the result of the comparison (Figures 8a-8c, column 15, lines 54-58).

10. As to **Claims 11 and 22, Barrall** teaches: wherein the excitation is arranged to excite quadrupole resonance (column 10, lines 45-51).

11. As to **Claims 13 and 24, Barrall** teaches: providing an alarm signal if the sample is determined to be present (column 15, line 64-column 16, line 8).

12. As to **Claims 14 and 25, Barrall** teaches: wherein the method is a method of nuclear quadrupole resonance testing a sample containing quadrupolar nuclei (column 10, lines 45-52), which sample may give rise to spurious signals which interfere with

response signals from the quadrupolar nuclei (column 10, lines 51-60, column 11, line 67-column 12, line 9), the method further comprising: applying a pulse sequence to the sample to excite nuclear quadrupole resonance, the pulse sequence comprising at least one pair of pulses (column 10, lines 13-18, lines 45-51); detecting response signals (column 10, lines 51-60); and comparing, for the or each such pair, respective response signals following the two member pulses of the pair (column 11, lines 39-43, column 14, lines 52-57); the pulse sequence being such that respective spurious signals following the two member pulses can be at least partially cancelled by the comparison without corresponding true quadrupole resonance signals being completely cancelled (column 11, lines 28-39).

13. As to **Claim 16, Barrall** teaches: wherein the apparatus is adapted to produce models of the signal, and to compare the models to a predetermined model, until the model is determined to represent a signal due to the phenomenon or until a given number of repetitions have been completed (Figures 8a-8c, column 15, lines 54-58).

14. As to **Claim 26, Barrall** teaches: A computer readable medium having stored thereon a program for carrying out the method of claim 1 (column 10, lines 18-27, Figure 3, element 32, column 11, lines 10-16, column 14, lines 52-67).

15. As to Claims **1, 4, 5, 7, 9, 12, 15, 19 and 23, Barrall** further teaches using time domain techniques (column 14, lines 63-67, column 15, lines 39-49). Although **Barrall** teaches producing a response signal which includes the response and undesired signal, **Barrall** does not expressly teach producing a model of this response signal, wherein the model models the response and the undesired signal, comparing the model to a predetermined model of an undesired signal, comparing the model to a predetermined model of a response from a sample, wherein the producing step is carried out using a statistical time domain technique.

16. **Schaewe** teaches measuring and modeling methods used for magnetic resonance imaging including producing a model of this response signal using a statistical time domain techniques, wherein the model models the response and the undesired signal wherein the noise is modeled and suppressed for image quality (equations 1, 4-5, Section III A, Section III B, paragraph 2, page 309, column 2, paragraph 1, Section V, second paragraph).

17. Although **Schaewe** is directed to magnetic resonance imaging, both **Schaewe** and **Barrall** are directed spectroscopy methods and to the measurements of resonance responses including capturing these response signals containing FID and echo signals (**Schaewe**, Section II, first paragraph, last sentence). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the signal response as taught in **Barrall** to be model the signal response and undesired signal using statistical time domain techniques as taught in **Schaewe** since modeling the resonance response of a signal using statistical time domain techniques is known in the spectroscopy art as taught in **Schaewe**. Further, **Barrall** alludes to time domain techniques and using characteristics of a signal in memory for comparison to the measured resonance response signal that may be concluded to be a form of a model for the signal although not expressly stated. It would have been obvious to compare the model to a predetermined model for a signal and a model for an undesired signal since it would have been obvious to model the signal response and noise as taught by **Schaewe** as discussed previously, and since **Barrall** already teaches comparing the response signal to the expected response signal for a particular sample after the noise component is filtered out. Furthermore, **Barrall** teaches a superior model-based estimators (pg.371, right column, lines 1-6) with inclusion of the initial FID following the 90-degree pulse, which provides significant signal energy for more precise Fourier-transform estimates (pg. 372, left column, lines 1-6).

Section II: Response to Arguments (1st Office Action)

Information Disclosure Statement/Arrangement of Specification

18. Examiner acknowledges and accepts new information disclosure statement and amended specification.

103(a)

19. Applicants are thanked for addressing this issue. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

20. In response to applicant's argument that "Barrall makes no contribution over the prior art", the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

21. Furthermore, applicants state that the Barrall reference does not suggest what happens to the signal after combination or in other words the techniques described purport to improve the SNR. The Office refutes this argument by denoting the claims are, verbatim, silent on this limitation. Thus rejection stands.

Conclusion

22. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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23. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Citation of Relevant Prior Art

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- Stuart-S.N., "The Most Coherent Interpolation of Transient Response Functions" 1996. The Institute of Physics. pg.128-134
- Dillon-K.B., "Nuclear Quadrupole Resonance Spectroscopy" Royal Society of Chemistry 2000 pg.192-210
- Dillon-K.B., "Nuclear Quadrupole Resonance Spectroscopy" Royal Society of Chemistry 2000 pg.192-210
- Lawes et al., "NQR Signal Processing" Patent GB00/02582.
- Smith et al., "NQR Testing Method and Apparatus" Patent WO9945409, 1999.

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Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mr. Tom Stevens whose telephone number is 571-272-3715, Monday-Friday (8:00 am- 4:30 pm EST).

If attempts to reach the examiner by telephone are unsuccessful, contact examiner's supervisor Mr. Leo Picard ((571) 272-3749). The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>.. Should the applicant(s) have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) (toll-free (866-217-9197)).

October 13, 2005


Paul L. Rodriguez 4/14/05
Primary Examiner
Art Unit 2125

TS